

## REMARKS

Claims 1-9, 11-86, 88-94, and 105 are pending in the present application. The Examiner has maintained the rejection of claims 1-9, 11-86, 88-94 and 105 under 35 U.S.C. §103(a). Applicant has amended claims 1 and 63. No new matter has been added.

### **Section 103 Rejections**

Claims 1-9, 11-29, 33-35, 37-42, 45, 47, 49-51, 53, 55, 58-80, 84-85, 87-92, and 105 were rejected under 35 U.S.C. §103(a) as being obvious over Abreu, *et al.*, “Video-Based Multi-Agent Traffic Surveillance System”, Proceedings of the IEEE 2000 Intelligent Vehicles Conference, 4-5 October 2000, pgs. 457-462 (VM), in view of U.S. Patent Application Publication No. 2007/0154067 (Laumeyer, *et al.*).

Claims 30-32, 46, 48, 52, 54, and 81-83 were rejected under 35 U.S.C. §103(a) as being obvious over VM.

Applicant urges that at the very least, the combination of VM and Laumeyer fails to disclose or suggest Applicant’s *method for detecting one or more objects belonging to the same object class . . . wherein said method is adapted for detecting moving and stationary objects from a moving video camera*, as essentially recited in claims 1, 49, and 105.

Referring to the Response to Arguments section of the Final Office Action, contrary to the Examiner’s allegation in section 2.a, Applicant did not state in the response filed on November 25, 2008, that VM is not combinable with Laumeyer because VM’s change detector cannot be used with a moving camera. What Applicant stated was that Laumeyer does not disclose a method for detecting moving objects, because Laumeyer’s method is for detecting stationary objects, specifically signs. Applicant also provided evidence from Laumeyer’s disclosure as to why the Examiner’s allegation that Laumeyer disclosed detecting pedestrians, who are presumably moving objects, was wrong, and that Laumeyer was really referring to detecting signs for

pedestrians. The only reference to a pedestrian in Laumeyer's disclosure is a sentence in pp. [0059], "Furthermore, pedestrian, cycle, and RV path signage identification may likewise benefit from the present invention." There is no disclosure in Laumeyer of how pedestrians, cycles, and RV path signs would be recognized, given the differences in appearance from road signs, thus Applicant urges that this sentence is not enabling for the identification of pedestrians. In addition, this sentence does not indicate whether the pedestrians are moving or stationary. The rest of Laumeyer's disclosure concerns the detection of stationary signs, and does not enable the detection of moving objects. Furthermore, this sentence could also be interpreted as not referring to the detection of pedestrians, cycles, and RV path signs at all, but to detecting signs for pedestrians, cycles, and RV paths. This interpretation is enabled by Laumeyer's disclosure. The Examiner has not responded to this argument. Thus, modifying VM with Laumeyer would enable a moving camera to detect signs, which are stationary, but not moving objects, as recited in claims 1, 49, and 105.

The Examiner again alleges that VM teaches detecting object components of different sizes, citing VM pg. 459, left column, lines 26-29, stating that "VM clearly shows the matching of an observed size of a mobile object with a previously gathered size of the object in order to classify the object observed." Applicant respectfully disagrees with the Examiner. The cited section of VM states that "classification methods are based on the matching of the observed size of a mobile object with previously gathered information of typical sizes for objects of all classes". This section only addresses matching a size of a whole object, and does not address detecting object parts of different sizes, whereas Applicant's claims 1 and 63 recite using a number of component classifiers to detect object components of different sizes at multiple scales. The Examiner's allegation that VM teaches detecting object components of different sizes is an improper application of hindsight acquired from Applicant's disclosure onto the VM disclosure.

In response to Applicant's statement that VM does not teach accumulating confidence scores across multiple frames, recited in applicant's claims 37 and 49, the Examiner simply stated that VM discloses a confidence factor for each classification.

The Examiner does not provide any evidence from VM of accumulating confidence scores across multiple frames, as VM does not disclose accumulating confidence scores across multiple frames.

Further regarding claim 37, the Examiner talks about determining a next trajectory whenever new information is received, citing VM, pg. 459, left column, line 49 to right column, line 2. The Examiner appears to confuse the concept of “trajectory” with “confidence scores”. A confidence score is used to determine if an object has been detected. It is not a trajectory. Only after an object is detected does Applicant’s method track the object over subsequent image frames, as recited in claims 40 and 90, and their respective dependent claims.

The Examiner also alleges that VM teaches the use of classifiers, recited in Applicant’s claims 11, 64, and 105, citing pg. 459, left column, lines 37-38. Applicant respectfully disagrees. The cited section of VM states that the “adaptation of the class templates is based on well known algorithms for competitive learning”, citing S. Haykin, Neural Networks: A Comprehensive Foundation, Prentice Hall, 1999. Thus, VM discloses the use of neural networks, and does not disclose the use of classifiers trained by boosting.

Contrary to the Examiner’s allegation in the Response to Arguments, section 2.d, that she does not rely on Laumeyer to teach classifiers but rather depends on VM to teach classifiers, Applicant notes that on page 15 of the Final Office Action, in rejecting claim 105, the Examiner states “Laumeyer teaches classifying the object detected based on color and shape”, citing paragraph [0056], lines 14-18, and alleging that two identifiers for the same object are therefore overlapping.

As noted in Applicant’s response filed on November 25, 2008, Laumeyer nowhere discloses the use of classifiers to identify signs in video streams, but rather uses subjectively defined image features and image filters to segment objects. The cited section of Laumeyer states “a color data set can begin as a single pixel of a recognizable color belonging to the subset of acceptable road sign colors and the morphology

principles are used to determine shape based on at least a four (4) pixel height and an ten (10) pixel width.” There is no teaching or suggestion in this passage of *one or more classifiers include overlapping component classifiers*, as recited in claims 20 and 105, and the Examiner’s allegation that color and shape are considered overlapping classifiers because these describe a same object constitutes another improper application of hindsight acquired from Applicant’s disclosure onto Laumeyer’s disclosure. Furthermore, since Laumeyer does not disclose classifiers, Laumeyer cannot disclose overlapping component classifiers, since one derives from the other. What the Examiner characterizes as “overlapping component classifiers” is in fact just two different rules using presented features.

Regarding claim 20, which also recites that *the one or more classifiers include overlapping component classifiers*, the Examiner cited VM, pg. 461, Fig. 4 and pg. 462, left column, lines 3-8 as disclosing this limitation. This section of VM discloses how one can infer a 3D shape from a 2D extracted object assuming plane motion and rigid objects. From the resulting cloud of 3D points a 3D size (a bounding box), position and speed are inferred, and Fig. 4 depicts typical results. The Examiner seems to confuse Fig. 4 with the real image appearance, i.e. real pixel values in an image area which is being processed by the methods of claims 1 and 105. VM does not detect any object components, and the bounding box is a sketch made to enclose an image area where a moving object has been detected by a change detector. In addition, the Examiner alleges that “the overlapping component mat be the different information extracted from the 3D information, since all information is based on a single object.” Applicant urges that the Examiner appears to be making up her own definition of overlapping, since different information extracted from a same object need not be from overlapping components. Furthermore, the method outlined in VM (estimating a motion field within segmented object masks, determining the structure of the object without scale, and matching the corresponding shape with a 2D mask to yield scale information) nowhere teaches or suggests the use of *one or more classifiers include overlapping component classifiers*. Again, by inferring *overlapping component classifiers* from VM, the Examiner is again

engaging in an improper application of hindsight acquired from Applicant's disclosure onto the VM disclosure.

Thus, for the reasons presented above, Applicant urges that the combination of VM and Laumeyer do not teach or suggest all limitations of claims 1, 19, and 105, that that therefore these claims are not *prima facie* obvious over VM and Laumeyer. Reconsideration and withdrawal of these rejections are respectfully requested.

Claims 2-9, 11-35, 37-42, 45-48, 50-55, 58-85, and 87-92, all depend from either claim 1 or claim 49, are patentable for at least the same reasons as claims 1 and 49. Reconsideration and withdrawal of these rejections are respectfully requested.

Claims 36, 43-44, 56-57, 86, and 93-94 were rejected under 35 U.S.C. §103(a) as being obvious over VM in view of U.S. Patent No. 5,761,326 (Brady, et al.).

Brady is directed to a machine vision system that acquires images from roadway scenes and processes the images by analyzing the intensities of edge elements within the image. Brady applies fuzzy set theory to the location and angles of each pixel after the pixel intensities have been characterized by vectors. However, Brady does not rectify the deficiencies of VM and Laumeyer, discussed above, and thus Applicant urges that a *prima facie* case of obviousness against claims 36, 43-44, 56-57, 86, and 93-94 over VM, Laumeyer and Brady cannot be maintained. Reconsideration and withdrawal of these rejections are respectfully requested.

**CONCLUSION**

Applicant urges that claims 1-9, 11-86, 88-94, and 105, as amended, are in condition for allowance for at least the reasons stated. Early and favorable action on this case is respectfully requested.

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Respectfully submitted,



Michele L. Conover

Reg. No. 34,962

Attorney for Applicants

Siemens Corporation  
Intellectual Property Department  
170 Wood Avenue South  
Iselin, New Jersey 08830  
(732) 321-3013